Trend Study 24-12-03

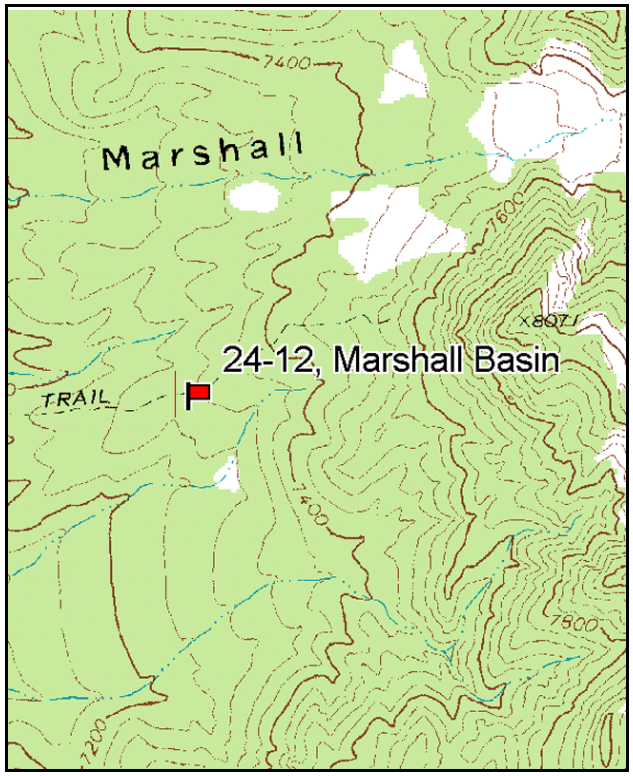
Study site name: Marshall Basin . Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 170 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

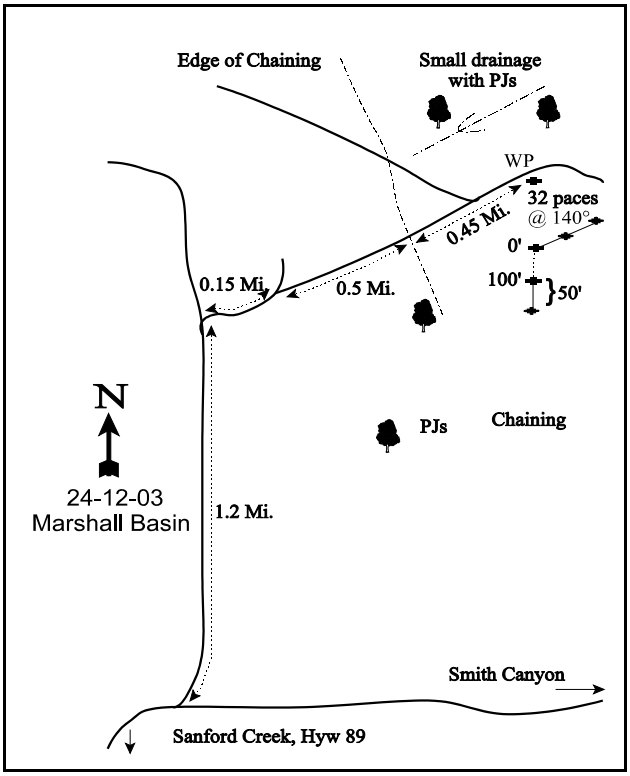
LOCATION DESCRIPTION

About 8 miles north of Panguitch on Highway 89 (or 1.7 miles south of the SR20 and Highway 89 junction) turn east onto the Sanford Creek Road. Travel 4 miles east on the main road to a fork. Bear left towards Smith Canyon. Go 1.5 miles to a fork just below the mouth of Smith Canyon, turn left. Continue 1.2 miles to a fork. Stay right and go 0.15 miles to another fork. Stay right and continue 0.5 miles to the edge of a chaining. Continue 0.45 miles east into the chaining to the study area. The witness post is on the right side of road. From the witness post walk 32 paces at 140 degrees magnetic to the 0' stake. The 0' baseline stake is marked by browse tag #9003.




Map Name: Blind Spring Mountain

Township 32S , Range 4 1/2W , Section 34




Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4204198 N, 384056 E

## DISCUSSION

### Marshall Basin - Trend Study 24-12

This site monitors a chained and seeded pinyon-juniper area in Marshall Basin. It is located on the western slope of the herd unit. Approximately 900 acres were chained and seeded in the fall of 1984 as part of a cooperative project involving the Powell Ranger District and the Division of Wildlife Resources. Elevation of the site is approximately 7,300 feet. The chained area consists of alluvial benches which gradually slope westward toward the Sevier River. Steep, wooded slopes provide a significant amount of cover above the chaining. Protective cover is also present in the draws which traverse the chained area. This is thought to be a key wintering area for mule deer. Quadrat frequency of deer and elk pellet groups were fairly abundant in 1997 at 20% and 21% respectively. Pellet group data from 2003 estimated low wildlife use at only 1 deer and 16 elk days use/acre (3 ddu/ha and 40 edu/ha). A few old cattle pats were also encountered in 2003.

Soil is deep with an effective rooting depth estimated at nearly 18 inches. Texture is a sandy loam. The soil surface is quite loose and much of it is exposed. Erosion pavement is quite common and was present prior to the chaining. Soil temperature is high averaging 71°F at a depth of nearly 14 inches indicating a dry soil profile. Litter makes up a large part of the groundcover on this site, around 40% in 1997 and 2003. Scattered debris from the chaining and litter buildup from ungrazed grasses help to stabilize the soil on this site but total protective ground cover is marginal. Some erosion is apparent and the erosion condition class was determined to be slight in 2003.

The chaining project was initiated to increase browse on deer winter range, but shrubs have been slow to become established on this chaining. The area is presently more valuable to deer during the spring and fall, at which time the area provides quality, succulent herbaceous forage. Shrubs found on the site include very low numbers of mountain big sagebrush and bitterbrush (only 20 plants/acre). The less preferred but more abundant rubber rabbitbrush is increasing on the site from 220 plants/acre in 1997 to 340 by 2003.

The herbaceous understory provides over 80% of the total vegetation cover on the site. The only abundant species is crested wheatgrass. It provided 86% of the grass cover in 1997 and 97% in 2003. Intermediate wheatgrass was seeded but it is not very abundant indicating that the site is too dry for the intermediate wheatgrass. The site supported a variety of forbs in 1987 but many were weedy increasers. Since then many forbs have disappeared from the site and only 3 species were encountered in 2003.

#### 1991 TREND ASSESSMENT

Basic cover trends did show some notable changes that should not be considered good even though percent bare ground did decrease since 1987 from 17% to 12%. Vegetative cover also declined during this same period along with the combined value for rock and pavement increasing from 17% up to 32%. Trend should be considered sightly downward. There are no noteworthy browse species of any consequence on the site at this time, but through time sagebrush should come onto the site. Seeded crested wheatgrass still dominates the site. The herbaceous understory has lost many forbs since 1987. The forbs have gone from 14 species down to 6 in 1991. The seeded alfalfa and small burnet were not found in 1991. However, some of the forbs which have disappeared from the site include weedy early seral species. This was probably a direct result of the extended drought along with increased competition from crested wheatgrass. Another seeded grass, intermediate wheatgrass, did not increase, but stayed at almost the same frequencies as noted in 1987. It has been too dry for this species to increase it's presence on this site. Trend for herbaceous understory is considered stable due to the loss of weedy forbs and a similar sum of nested frequency for grasses.

TREND ASSESSMENT
soil - slightly downward (2)
browse - stable but lacking (3)
herbaceous understory - stable (3)

1997 TREND ASSESSMENT

Trend for soil is considered stable even though percent bare ground increased from 12% to 21%. Pavement and rock cover both declined substantially. Litter cover also declined but this would be expected as litter debris from the chaining deteriorates over time. Vegetative cover is moderately abundant with an average cover value of 16%. Nearly all (87%) of this cover comes from herbaceous plants which are more effective at protecting the soil. Trend for browse is slightly up with some sagebrush and bitterbrush sampled in 1997. They occur in very small numbers but will likely increase in time. Trend for the herbaceous understory is stable with a change in composition. Nested frequency of crested wheatgrass increased significantly, but nested frequency of bottlebrush squirreltail and blue grama declined significantly. In 1987, squirreltail had a nested frequency slightly higher than crested wheatgrass, 88 compared to 103. In 1991, nested frequency of squirreltail was 106 and quadrat frequency was 44%. By 1997, nested frequency declined to only 3 and quadrat frequency to 1%. Forbs are still rare.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly but rare (4)
herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is down slightly since 1997. Cover of bare ground increased from 21% to 30% while vegetation and litter cover declined. Some erosion is occurring but it is not severe and the erosion condition class was determined to be slight in 2003. Shrubs are sill rare on the site with the most preferred species, mountain big sagebrush and bitterbrush, occurring at a density of only 20 plants/acre. No seedlings or young were encountered for either species. The only fairly common shrub is white rubber rabbitbrush which was estimated at only 340 plants/acre. Browse trend is considered stable, but shrubs are still not abundant enough to provide much winter browse forage for deer and elk. The herbaceous understory is poor with crested wheatgrass providing virtually all of the herbaceous cover. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses declined 29% with a significant decrease in the nested frequency of crested wheatgrass. Forbs remain rare and have declined slightly in nested frequency.

TREND ASSESSMENT
soil - down slightly (2)
browse - stable (3)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Management unit 24 , Study no: 12

| Type | Species | Nested Frequency | | | | Average Cover % | |
|---|---|---|---|---|---|---|---|
| | | '87 | '91 | '97 | '03 | '97 | '03 |
| G | Agropyron cristatum | $_{a}$88 | $_{a}$124 | $_{c}$225 | $_{b}$165 | 11.48 | 7.84 |
| G | Agropyron intermedium | 2 | 3 | 8 | 3 | .07 | .03 |
| G | Bouteloua gracilis | $_{c}$100 | $_{b}$55 | $_{a}$17 | $_{a}$10 | .21 | .19 |
| G | Bromus tectorum (a) | - | - | $_{b}$86 | $_{a}$4 | 1.47 | .04 |
| G | Festuca ovina | 4 | - | - | - | - | - |
| G | Oryzopsis hymenoides | $_{ab}$3 | $_{b}$8 | $_{ab}$1 | $_{a}$- | .01 | - |
| G | Poa secunda | 5 | 6 | - | - | - | - |
| G | Sitanion hystrix | $_{b}$103 | $_{b}$106 | $_{a}$3 | $_{a}$2 | .03 | .01 |
| Total for Annual Grasses | | 0 | 0 | 86 | 4 | 1.47 | 0.04 |
| Total for Perennial Grasses | | 305 | 302 | 254 | 180 | 11.80 | 8.07 |
| Total for Grasses | | 305 | 302 | 340 | 184 | 13.28 | 8.11 |
| F | Astragalus spp. | $_{a}$1 | $_{b}$16 | $_{a}$- | $_{a}$- | - | - |
| F | Chenopodium fremontii (a) | 12 | 3 | 2 | 12 | .01 | .11 |
| F | Cryptantha fulvocanescens | $_{c}$24 | $_{bc}$21 | $_{ab}$10 | $_{a}$2 | .05 | .00 |
| F | Cruciferae | - | 1 | - | - | - | - |
| F | Descurainia spp. (a) | - | - | 2 | - | .00 | - |
| F | Eriogonum hookeri (a) | $_{b}$51 | $_{a}$- | $_{a}$- | $_{a}$- | - | - |
| F | Erigeron pumilus | 1 | - | 1 | - | .00 | - |
| F | Ipomopsis aggregata | 4 | - | - | - | - | - |
| F | Lactuca serriola | $_{b}$118 | $_{a}$- | $_{a}$- | $_{a}$- | - | - |
| F | Lesquerella ludoviciana | 3 | 8 | - | - | - | - |
| F | Medicago sativa | $_{b}$11 | $_{a}$- | $_{a}$- | $_{a}$- | - | - |
| F | Nicotiana attenuata (a) | - | - | $_{a}$- | $_{b}$51 | - | 1.76 |
| F | Phlox longifolia | - | - | 1 | - | .00 | - |
| F | Salsola iberica (a) | $_{bc}$91 | $_{b}$12 | $_{a}$- | $_{a}$- | - | - |
| F | Sanguisorba minor | 8 | - | - | - | - | - |
| F | Taraxacum officinale | 3 | - | - | - | - | - |
| F | Tragopogon dubius | 1 | - | - | - | - | - |
| Total for Annual Forbs | | 154 | 15 | 4 | 63 | 0.01 | 1.87 |
| Total for Perennial Forbs | | 174 | 46 | 12 | 2 | 0.06 | 0.00 |
| Total for Forbs | | 328 | 61 | 16 | 65 | 0.07 | 1.88 |

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 24 , Study no: 12

| Type | Species | Strip Frequency '97 | Strip Frequency '03 | Average Cover % '97 | Average Cover % '03 |
|---|---|---|---|---|---|
| B | Artemisia pygmaea | 0 | 0 | .18 | - |
| B | Artemisia tridentata vaseyana | 1 | 1 | - | .15 |
| B | Chrysothamnus nauseosus hololeucus | 9 | 13 | .30 | 1.92 |
| B | Gutierrezia sarothrae | 4 | 4 | .21 | .18 |
| B | Juniperus osteosperma | 1 | 0 | .85 | - |
| B | Opuntia spp. | 6 | 2 | .24 | .15 |
| B | Pinus edulis | 3 | 1 | .15 | - |
| B | Purshia tridentata | 1 | 1 | - | - |
| Total for Browse | | 25 | 22 | 1.94 | 2.40 |

CANOPY COVER, LINE INTERCEPT --
Management unit 24 , Study no: 12

| Species | Percent Cover '03 |
|---|---|
| Artemisia tridentata vaseyana | .50 |
| Chrysothamnus nauseosus hololeucus | 2.93 |
| Pinus edulis | .10 |

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 24 , Study no: 12

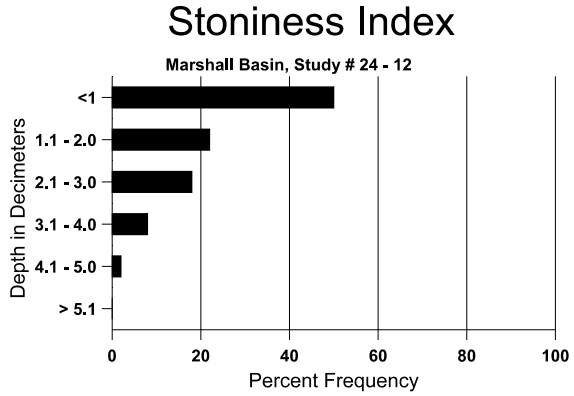
| Species | Average leader growth (in) '03 |
|---|---|
| Purshia tridentata | 3.0 |

BASIC COVER --
Management unit 24 , Study no: 12

| Cover Type | Average Cover % | | | |
|---|---|---|---|---|
| | '87 | '91 | '97 | '03 |
| Vegetation | 6.75 | 4.00 | 16.23 | 12.96 |
| Rock | 7.25 | 4.25 | 2.74 | 6.09 |
| Pavement | 9.75 | 28.25 | 18.25 | 18.93 |
| Litter | 59.00 | 51.50 | 41.13 | 39.43 |
| Cryptogams | 0 | 0 | .09 | 0 |
| Bare Ground | 17.25 | 12.00 | 21.42 | 30.42 |

SOIL ANALYSIS DATA --
Management unit 24, Study no: 12, Study Name: Marshall Basin

| Effective rooting depth (in) | Temp °F (depth) | pH | %sand | %silt | %clay | %0M | PPM P | PPM K | dS/m |
|---|---|---|---|---|---|---|---|---|---|
| 17.8 | 71.3 (13.7) | N/A | 57.3 | 24.1 | 18.6 | 2.0 | 24.6 | 188.8 | 0.5 |




PELLET GROUP DATA --
Management unit 24 , Study no: 12

| Type | Quadrat Frequency | | Days use per acre (ha) |
|---|---|---|---|
| | '97 | '03 | '03 |
| Rabbit | 8 | 42 | - |
| Cow | - | - | 2 (5) |
| Elk | 20 | 15 | 16 (40) |
| Deer | 21 | 9 | 1 (3) |

BROWSE CHARACTERISTICS --
Management unit 24 , Study no: 12

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % poor vigor | Average Height Crown (in) |
| Artemisia tridentata vaseyana | | | | | | | | | | | |
| 87 | **0** | - | - | - | - | - | 0 | 0 | 0 | 0 | -/- |
| 91 | **0** | - | - | - | - | - | 0 | 0 | 0 | 0 | -/- |
| 97 | **20** | - | - | 20 | - | - | 0 | 0 | 0 | 0 | -/- |
| 03 | **20** | - | - | - | 20 | - | 0 | 0 | 100 | 0 | -/- |
| Chrysothamnus nauseosus hololeucus | | | | | | | | | | | |
| 87 | **66** | - | - | 66 | - | - | 0 | 0 | 0 | 0 | 19/13 |
| 91 | **66** | - | - | 66 | - | - | 0 | 0 | 0 | 0 | 28/17 |
| 97 | **220** | - | 100 | 100 | 20 | 60 | 0 | 0 | 9 | 9 | 32/45 |
| 03 | **340** | - | - | 320 | 20 | - | 6 | 0 | 6 | 0 | 29/44 |
| Chrysothamnus viscidiflorus viscidiflorus | | | | | | | | | | | |
| 87 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| 91 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| 97 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | 13/20 |
| 03 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| Gutierrezia sarothrae | | | | | | | | | | | |
| 87 | **466** | - | 100 | 366 | - | - | 0 | 0 | 0 | 0 | 9/10 |
| 91 | **932** | - | 33 | 866 | 33 | - | 14 | 4 | 4 | 11 | 7/8 |
| 97 | **200** | - | - | 200 | - | - | 0 | 0 | 0 | 0 | 9/13 |
| 03 | **160** | 280 | 120 | 40 | - | 40 | 0 | 0 | 0 | 0 | 6/5 |
| Juniperus osteosperma | | | | | | | | | | | |
| 87 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| 91 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| 97 | **20** | - | 20 | - | - | - | 0 | 0 | - | 0 | -/- |
| 03 | **0** | - | - | - | - | - | 0 | 0 | - | 0 | -/- |
| Opuntia spp. | | | | | | | | | | | |
| 87 | **66** | - | 66 | - | - | - | 0 | 0 | - | 0 | -/- |
| 91 | **33** | - | - | 33 | - | - | 0 | 0 | - | 0 | 3/7 |
| 97 | **120** | - | 20 | 100 | - | - | 0 | 0 | - | 0 | 3/13 |
| 03 | **40** | - | - | 40 | - | - | 0 | 0 | - | 0 | 4/11 |
| Pinus edulis | | | | | | | | | | | |
| 87 | **33** | - | 33 | - | - | - | 0 | 0 | - | 0 | -/- |
| 91 | **33** | - | 33 | - | - | - | 0 | 0 | - | 0 | -/- |
| 97 | **60** | 20 | 60 | - | - | - | 0 | 0 | - | 0 | -/- |
| 03 | **20** | - | 20 | - | - | - | 0 | 0 | - | 0 | -/- |

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % poor vigor | Average Height Crown (in) |
| Purshia tridentata | | | | | | | | | | | |
| 87 | **0** | - | - | - | - | - | 0 | 0 | 0 | 0 | -/- |
| 91 | **0** | - | - | - | - | - | 0 | 0 | 0 | 0 | -/- |
| 97 | **20** | - | 20 | - | - | - | 100 | 0 | 0 | 0 | 18/40 |
| 03 | **20** | - | - | - | 20 | - | 0 | 0 | 100 | 100 | 22/60 |